
Autodesk® ArtCAM® 2018

Getting Started



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About this Getting Started guide

This Getting Started guide provides information about the basic concepts of ArtCAM and demonstrates some of the available features:

- To start ArtCAM
- To create a model
- About the model screen
- About vectors
- About bitmaps
- About reliefs
- About toolpaths
- To save a model
- To exit ArtCAM.

About ArtCAM

ArtCAM is an all-in-one CAD/CAM software package for designing artistic products and manufacturing them using CNC machine tools or laser-engraving machines.

Designing

You can create 2D designs by importing images or creating images using vectors and bitmaps. You can also create 3D designs by importing reliefs or creating reliefs from vectors and bitmaps.

Manufacturing

When you have finished creating the 2D or 3D design, you can choose a machining toolpath to manufacture the design into a product. After ArtCAM calculates and generates the toolpath, you can simulate the toolpath, before then saving it and exporting the data to the machine.

ArtCAM also enables you to create triangle meshes from reliefs and export these designs for 3D printing, so you can manufacture products without needing to generate any toolpaths.

About accessing help

ArtCAM includes several ways to access help, including the **Help** menu, in-line help, tooltips, and the status bar.

The Help menu

Use the **Help** menu on the **Menu** bar to access information about ArtCAM. Select:

- **Contents** to display the Reference Help, which includes detailed information about the features available in ArtCAM.



*The keyboard shortcut is **Shift+F1**.*

- **What's New** for information about the new features in the latest release.



*You can also access the Reference Help and What's New documents, as well as this Getting Started guide and links to tutorial videos, the Autodesk Knowledge Network, and the Autodesk ArtCAM Forum, from the **Help** page on the start screen.*

In-line help

Use the in-line help to access information about a specific panel.

To display the in-line help for a panel, click  in the panel's header. Click  again to hide the in-line help.

Tooltips and the status bar

Use tooltips and the status bar to view information about a specific toolbar button or menu option.

To display the help for a toolbar button or menu option, position the cursor over the button or option.

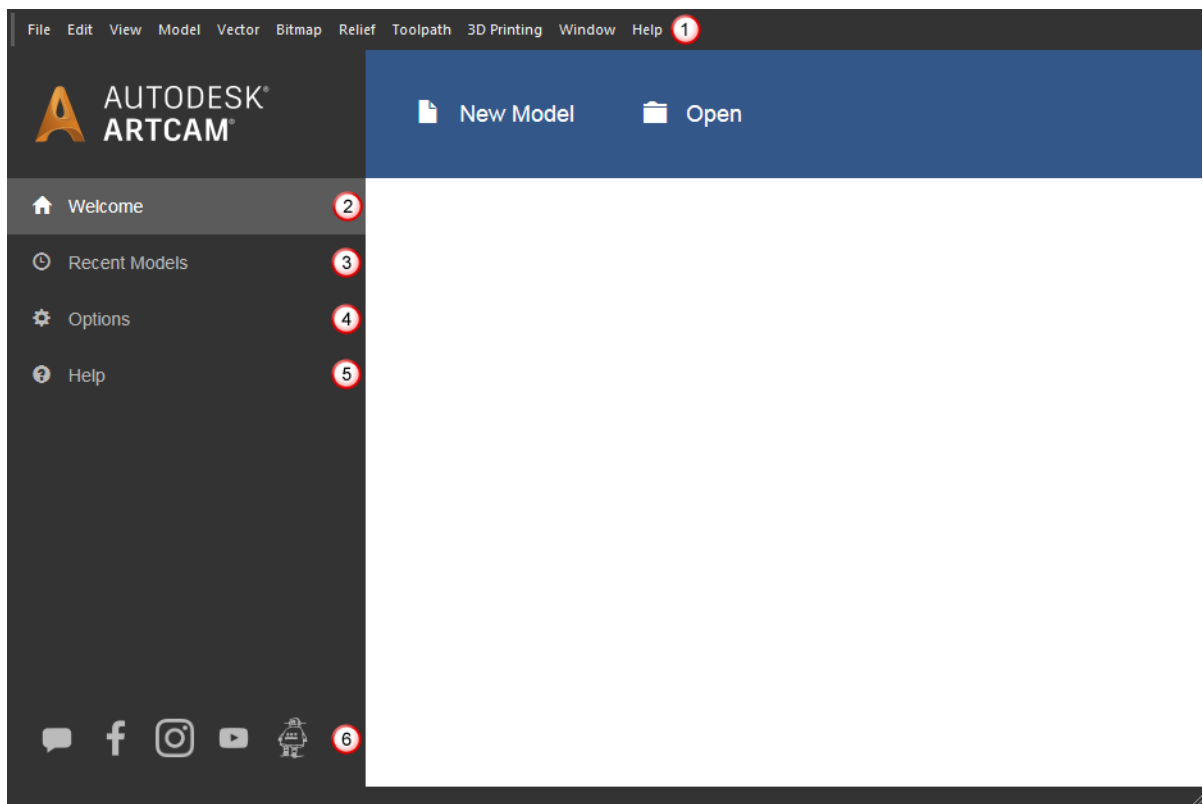
See also

- To start ArtCAM (see page 3)
- About the user interface (see page 7)

To start ArtCAM



To start ArtCAM, double-click the **Autodesk ArtCAM 2018** icon on the desktop, or select **Autodesk ArtCAM 2018** in the Windows **Start** menu or **Start** screen. The ArtCAM start screen is displayed, for example:



Area	Description
①	The Menu bar is located at the top of the main window. Click an entry to display a list of options.  <i>Most menu options become active only when working within a model. The availability of some menu options is license dependent.</i>
②	Click Welcome to create and open models. Click: ▪ New Model to create a model. The model screen is displayed. ▪ Open to open an existing model.
③	Click Recent Models to list the last four files you have been working with. Click a file in the list to open it.
④	Click Options to specify the settings and defaults for ArtCAM.
⑤	Click Help to access this guide, the Reference Help and What's New documents, and links to online resources.
⑥	Click an icon to check the Internet for more information about ArtCAM.

See also

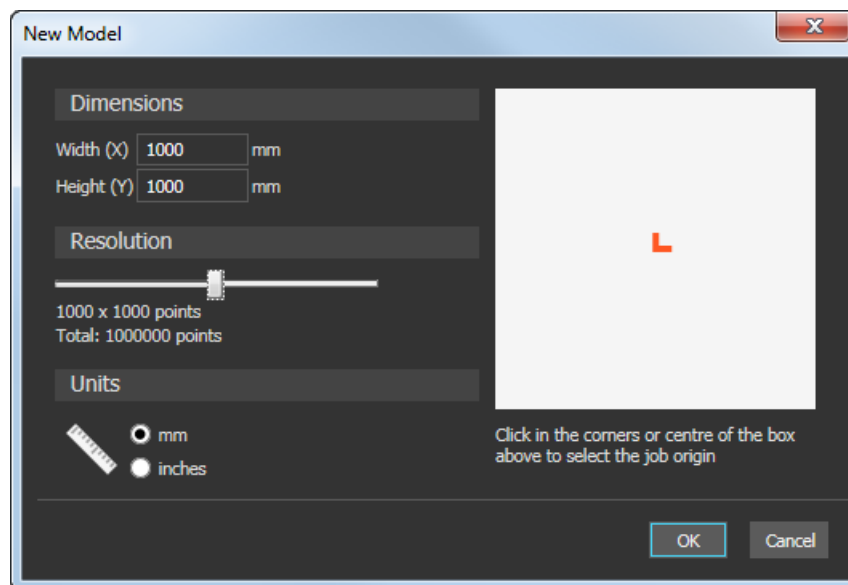
- To create a model (see page 5)
- About accessing help (see page 2)

To create a model

A model is where you do all of your work within ArtCAM. The model includes the vectors, bitmaps, reliefs, and toolpaths to be used to manufacture a product. When you create a model, you need to specify the dimensions of the sheet of material on which you are going to design the product, the resolution in which you want to work, the origin of the model, and the units in which you want to work.

To create a model:

- 1 On the start screen, click **New Model**. The **New Model** dialog is displayed.



- 2 Select the **Units** in which you want to work.
- 3 Enter the **Width (X)** and **Height (Y)** of the model. The white box shown in the dialog is updated to represent the shape of the sheet of material.
- 4 Click and drag the slider to specify the model's **Resolution**. The number of pixels is updated.

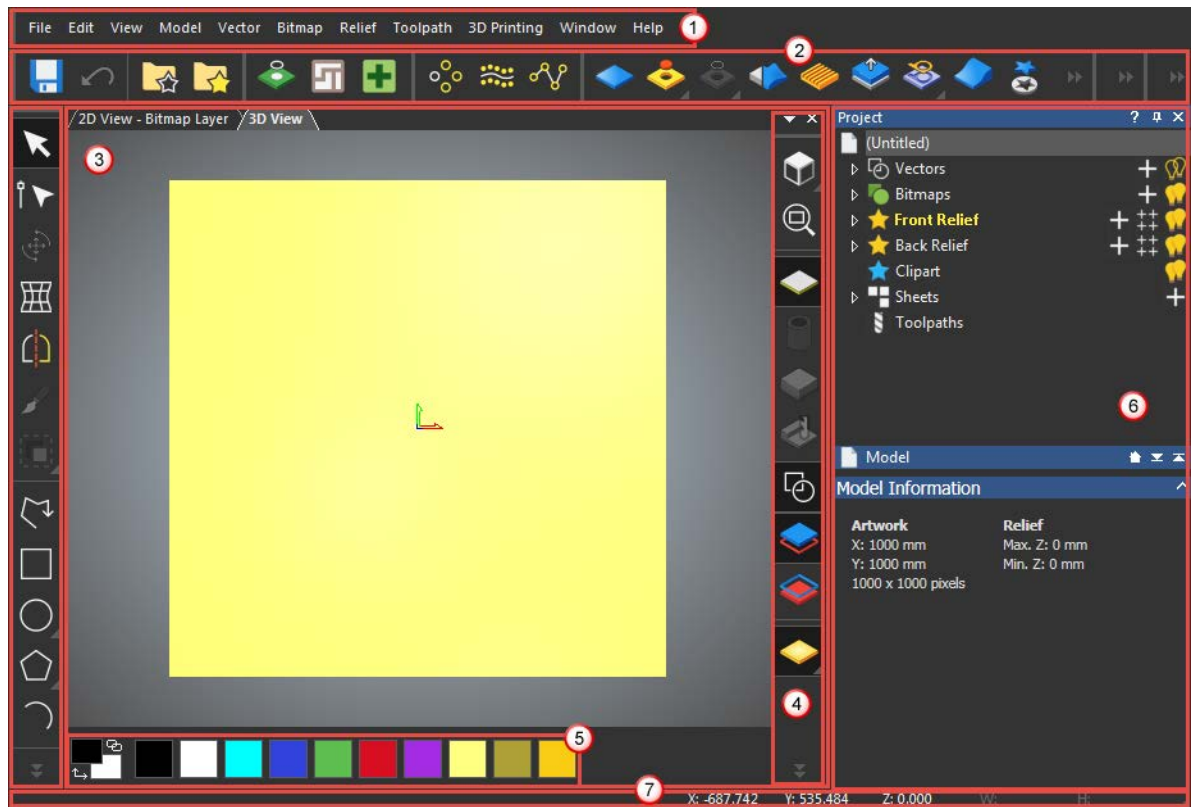
- 5 Click the centre or a corner of the white box to specify the model's origin. The position of the origin  icon is updated.
- 6 Click **OK** to create the model. The dialog closes and ArtCAM switches to display the model screen.

See also

- To start ArtCAM (see page 3)

About the model screen

When you are working within a model in ArtCAM, the model screen is displayed. For example:

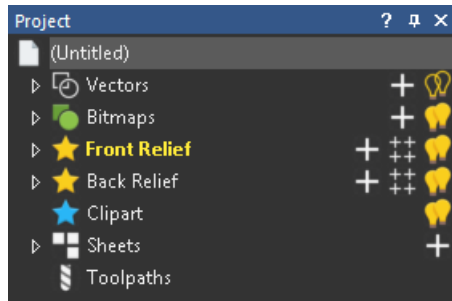


Area	Description
1	The Menu bar is located at the top of the main window. Click an entry to display a list of options. Many menu options have keyboard shortcuts.  <i>The availability of some menu options is license dependent.</i>
2	Toolbars provide shortcuts to the most frequently used menu options. Click a button to access the function directly.  <i>The availability of some toolbars is license dependent.</i>
3	The workspace area contains the 2D and 3D views, which are tabbed by default. Both views display vectors and bitmap artwork; only the 3D view displays reliefs, calculated toolpaths, and toolpath simulations.

4	The 2D View and 3D View toolbars enable you to manipulate the 2D and 3D views, and to control what is displayed. Which toolbar is displayed depends on which view is active.
5	The Palette displays the colours that make up any bitmap artwork as well as any custom colours you create.
6	The Project panel contains the Project Tree and the tools associated with the Vectors, Bitmaps, Front Relief, Back Relief, Clipart, Sheets, Toolpaths, and Simulation items.  <i>The Simulation item is available only when you have simulated a toolpath.</i>
7	The status bar displays the cursor's coordinates; the width and height of the bounding box when vectors or previews of toolpaths are selected; a command's description when you position the cursor over a button or menu option; and a progress bar when calculating reliefs and toolpaths.

About the Project Tree

The Project Tree is located on the **Project** panel and contains items to manage the model's vectors, bitmaps, reliefs, toolpaths, and toolpath simulations, and to control their display in the 2D and 3D views.

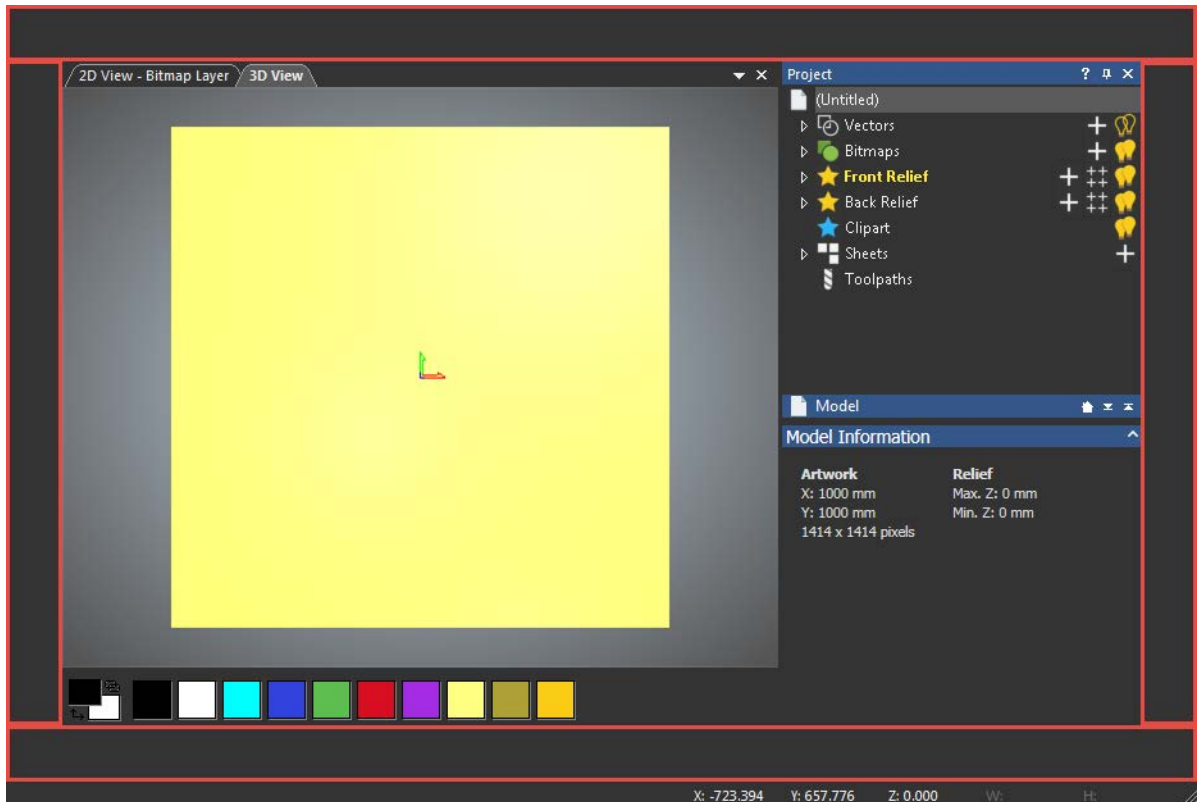


Layers

By default, the **Vectors**, **Bitmaps**, **Front Relief**, and **Back Relief** items in the Project Tree each contain a default layer, on which all vectors, bitmaps, and reliefs are created. To help organize your 2D and 3D designs, you can create multiple layers, which enable you to group individual vectors, bitmaps, or reliefs.

To work with toolbars

The main screen includes four docking areas in which you can position the **Menu** bar and any available toolbars. The areas are indicated in red:



Hiding and displaying toolbars

To hide a toolbar:

- 1 Select **Window > Toolbars and Docking Windows**. A submenu is displayed.



You can also display this submenu by right-clicking a docking area.

- 2 In the submenu, deselect the name of the toolbar you want to hide.

To redisplay the toolbar, select its name in the **Window > Toolbars and Docking Windows** submenu.

Repositioning toolbars

By default, the **Menu** bar and any displayed toolbars are docked in the upper- and left-docking areas.

To reposition a toolbar:

- 1 Position the cursor over the toolbar's grip, for example:



- 2 When the cursor changes to , click and drag the toolbar to its new position.

As you move the toolbar, ArtCAM updates the screen layout. When the toolbar is positioned away from a docking area, the toolbar's name is displayed.

- 3 When you have repositioned the toolbar, release the mouse button.

Reverting to the default layout

To revert any changes you make to the screen layout, select **Window > Reset Layout** or **Window > Layout > Standard**.



The availability of these menu options is license dependent.

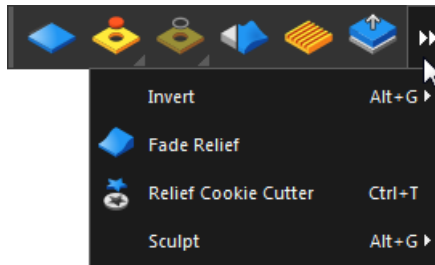
To work with toolbar buttons

The toolbars available in ArtCAM contain buttons for shortcuts to frequently used functions.



The availability of some toolbars is license dependent.

If a toolbar cannot display its entire collection of buttons, click  or  to display the hidden buttons, for example:



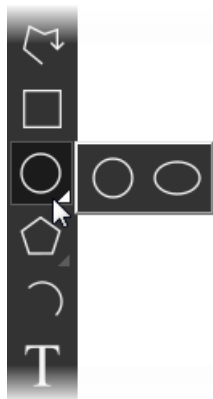
*You can reduce the size of buttons by deselecting the **Large icons** check box in the **Options** tab of the **Customize** dialog. To display the dialog, select **Window > Toolbars and Docking Windows > Customise**.*

Toolsets

Toolsets group together buttons for related functions. Toolsets are identified by  in a button's lower-right corner.

To display a toolset:

- 1 Position the cursor over the button whose toolset you want to display.
- 2 Click and hold the mouse button to display the additional buttons available in the toolset, for example:



- 3 To select a button in the toolset, position the cursor over the button you want to select, and then release the mouse button. The button is selected and is displayed on the toolbar.

To work with panels

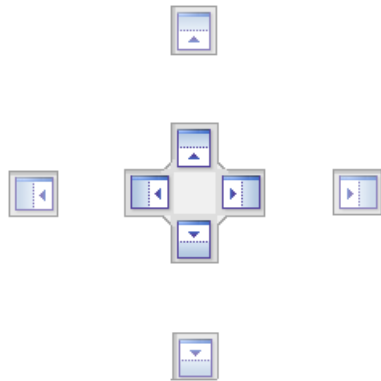
Panels are an important way of interacting with ArtCAM. Two of the most frequently used panels are the **Project** panel and the **Tool Settings** panel.

Repositioning panels

By default, the **Project** and **Tool Settings** panels are docked on the right of the model screen; other displayed panels are shown floating.

To dock a floating panel:

- 1 Click and drag the panel's header. ArtCAM displays targets on the edges and in the centre of the screen, for example:



- 2 Position the cursor over the target where you want to dock the panel, and then release the mouse button.

To float a docked panel:

- 1 Right-click the panel's header.
- 2 Select **Floating** in the context menu.

To return a panel to its previously docked position:

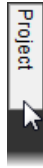
- 1 Right-click the panel's header.
- 2 Select **Docking** in the context menu.

Hiding and displaying panels

By default, docked panels are pinned, which means they are displayed until you close them. If you want, you can unpin docked panels. This creates a tab and hides the panel until you position the cursor over the new tab.

To unpin a docked panel:

- 1 Right-click the panel's header.
- 2 Select **Auto Hide** in the context menu. ArtCAM hides the panel and creates a tab with the panel's name, for example:



You can also unpin a docked panel by clicking  in the panel's header.

To close a panel:

- Click  on the panel's header; or
- Right-click the panel's header, and then select **Hide** in the context menu.

To redisplay the **Project** or **Tool Settings** panel:

- 1 Select **Window > Toolbars and Docking Windows**. A submenu is displayed.
- 2 In the submenu, select the name of the panel you want to display.

Reverting to the default layout

To revert any changes you make to the screen layout, select **Window > Reset Layout** or **Window > Layout > Standard**.



The availability of these menu options is license dependent.

To manipulate the 2D and 3D views

ArtCAM provides several functions to manipulate the 2D and 3D views. These are located on the **2D View** and **3D View** toolbars in the workspace area. Click:



to display the model from the top, looking along the Z axis.



to display the model from the left, looking along the X axis.



to display the model from the front, looking along the Y axis.



to display the Isometric 1 view of the model.



to resize the model so that it just fits in the view.

Using the mouse

You can also change the 2D and 3D views using the mouse. Use:



or



to zoom in and out of the 2D or 3D view.



to pan the 2D or 3D view.



to rotate the 3D view.

About vectors

Vectors are a type of image. They are made of simple lines, which consist of nodes linked by spans. Use vectors to create 2D shapes, from which you can create 2D machining toolpaths or create reliefs.

You can use the standard geometric shapes available in ArtCAM to create arcs, circles, ellipses, polygons, rectangles, squares, and stars; you can create free-form shapes using polylines; and you can create vector text. You can also import vectors from files, such as [.ai](#), [.eps](#), [.pdf](#), [.dxf](#), [.dwg](#), [.pic](#), and [.dgk](#).

See also

- About reliefs (see page 28)
- About toolpaths (see page 35)

To create free-form shapes

Use vector polylines when you want to create free-form shapes, for example, when tracing an image.

To create a free-form shape:



- 1 Select **Vector > Create > Polyline** or click the **Create Polyline** button. The cursor changes to  and the **Tool Settings: Polyline Creation** panel is displayed.
- 2 To draw smooth polylines, select the **Draw smooth polylines** check box in the **Tool Settings: Polyline Creation** panel.
- 3 Click to create a start node.
- 4 Move the cursor. A red line is displayed between the start node and the cursor.



If the cursor is orthogonal to the start node, the cursor changes to  or .

- 5 Click to create a node.
- 6 Move the cursor. A red line is displayed between the last node and the cursor.

If you selected the **Draw smooth polylines** check box, a red curve is displayed between the previous node and the cursor.

- 7 Repeat steps 5 to 6 to continue drawing the vector.



When the cursor changes to , click to create a node that is orthogonal to the previous node point and to the start node.

- 8 To close the vector, position the cursor near the start node, and then click when the cursor changes to .
- 9 When you have finished drawing, right-click to create the vector. The **Tool Settings: Polyline Creation** panel closes.

To create geometric shapes

Use vector arcs, circles, ellipses, polygons, rectangles, and stars when you want to create geometric shapes.

To create a geometric shape:

- 1 Select **Vector > Create**, and then the name of the geometric shape you want to create, for example, **Rectangle**. The cursor changes to  and the **Tool Settings** panel for the vector shape is displayed.
- 2 Click and drag the cursor to specify the size of the shape, or to specify the distance between the start and end points if creating an arc.
- 3 Release the mouse button.
- 4 If you are creating a star shape, move the cursor to specify the radius of the star's inner circle, then click.
- 5 If you are creating an arc, move the cursor to specify the radius of the arc, then click.
- 6 Right-click to create the vector. The **Tool Settings** panel closes.

To edit vectors

You can easily manipulate vectors by editing their nodes and spans.

To edit a vector's nodes and spans:

- 1 Select the vector. The vector is displayed in pink and surrounded by a bounding box.

- 2 Select **Vector > Node Editing** or click the **Node Editing** button. The **Tool Settings: Node Editing** panel is displayed and the cursor changes to  to indicate node-editing mode is enabled.

If you are editing a vector that uses linear spans, nodes are displayed.

If you are editing a vector that uses arc or Bézier-curve spans, nodes and control points are displayed.

- 3 To hide the control points, select the **Maintain smooth curves** check box in the panel.
- 4 To reposition a node
 - a Position the cursor over the node.
 - b When the cursor changes to , click and drag the node to its new position. The spans either side of the node are updated.
 - c When you have finished repositioning the node, release the mouse button.
- 5 If you are editing a vector that uses arc or Bézier-curve spans and want to edit the spans either side of a node:
 - a Position the cursor over one of the node's control points.
 - b When the cursor changes to , click and drag the control point. The spans either side of the node are updated.
 - c When you have finished editing the spans, release the mouse button.
- 6 To add a node point mid-way between two existing nodes:
 - a Select the **Display virtual mid-points** check box. Mid-points are displayed along the spans between the nodes.
 - b Position the cursor over a mid-point.
 - c When the cursor changes to , click the span. ArtCAM creates a node and displays the mid-points along the spans between the new node and its adjacent nodes.

- 7 Close the panel to disable node-editing mode.

To transform vectors

You can transform vectors by changing their scale, position, orientation, and shape.

To transform a vector:

- 1 Select the vector. The vector is displayed in purple and surrounded by a bounding box.



- 2 Select **Edit > Transform** or click the **Transform** button. The **Tool Settings: Transform** panel is displayed.

- 3 To resize the vector:

- a Position the cursor over a red handle .
- b When the cursor changes to , , , or , click and drag . The **Width** and **Height** in the panel are updated.
- c When you have finished resizing the vector, release the mouse button.

- 4 To reposition the vector:

- a Position the cursor over the vector.
- b When the cursor changes to , click and drag the vector to its new position. The **X**, **Y**, **ΔX**, and **ΔY** values in the panel are updated.
- c When you have finished repositioning the vector, release the mouse button.

- 5 To rotate the vector:

- a Position the cursor over the green handle .
- b When the cursor changes to , click and drag . The rotation angle in the panel is updated.
- c When you have finished reorienting the vector, release the mouse button.

- 6 To shear the vector:

- a Position the cursor over a pink handle .
- b When the cursor changes to , click and drag . The **W** and **H** angle values in the panel are updated.
- c When you have finished shearing the vector, release the mouse button.

- 7 When you have finished transforming the vector, close the panel.

About bitmaps

Bitmaps are a type of image, which consist of colour-assigned pixels. Examples of bitmaps are photographic and scanned images. Use bitmaps to create reliefs or convert bitmaps to vectors.

You can use the draw and paint functions available in ArtCAM to create bitmaps, or you can import bitmaps.

See also

- About vectors (see page 17)

To create a model by importing an image

You can create a model by importing a bitmap image. Examples of files you can import include **.bmp**, **.dib**, **.rle**, **.jpg**, **.jpeg**, **.jfif**, **.gif**, **.emf**, **.wmf**, **.tif**, **.tiff**, **.png**, and **.ico**. When creating a model from an image, you must specify the method by which you want to import the file.

To create a model by importing a bitmap image:

- 1 Display the **Open** dialog:
 - If you have not yet created a model, click **Open** on the start screen.
 - If you have already created a model, select **File > Open**.
- 2 Select the file you want to import.
- 3 Click **Open**. The **Open** dialog closes and the **Set Model Size** dialog is displayed, which shows the **Height** and **Width** of the model.
- 4 Select the **Units** in which you want to work.
- 5 Choose how you want to specify the size of the model. Select:
 - **Image size** to use the image's dimensions, and then enter the **Height** and **Width**.
 - **Scanned d.p.i.** to use the image's resolution, in dots per inch, and then enter the **d.p.i.**.

 *Reduce the **d.p.i.** to increase the model's size; increase the **d.p.i.** to reduce the model's size.*
- 6 Enter a **Height in Z** value to specify the maximum height of the model.
- 7 Click the centre or a corner of the white box to specify the **Origin** of the model.
- 8 Click **OK** to create the model and import the bitmap image. The dialog closes and the image is displayed in the 3D view of the model screen.

See also

- To start ArtCAM (see page 3)

To convert a bitmap image to vectors

If you have a bitmap image and want to use it to generate machining toolpaths, you must convert the bitmap to vectors.

To convert a bitmap to vectors:

- 1 Select the **2D View** tab to display the bitmap in the 2D view.

- 2 Select **Vector > Bitmap to Vector** or click the **Bitmap to Vector** button. The **Bitmap to Vector** panel is displayed.



- 3 Reduce the number of colours in the bitmap:

- a Click **Reduce Colours**. The **Reduce Number of Colours in Image** dialog is displayed.
- b Click and drag the slider to reduce the **New maximum number of colours for image**.
- c Click **OK** to close the dialog.

- 4 To create vectors along the boundary of the selected colour, select the **Create boundary** check box.

- 5 To create vectors along the centreline of the selected colour:

- a Select the **Create centreline** check box.
- b Enter a **Tolerance** value, in pixels, to specify how closely vectors follow the bitmap's pixelated outline.
- c Choose if you want the centreline vectors to be open or closed. Select:

Disconnected open vectors to create open vectors.

Closed vector loops to create closed vectors.

- 6 Enter a **Speckle size** value, in pixels, to specify how close the vectors follow the bitmap.

- 7 Enter a **Smoothness** value, in per cent. The higher the percentage, the smoother the spans within vectors.

- 8 In the **Colour** list, select the colour from which ArtCAM creates the vectors.

- 9 Click **Create Vectors**. The vectors are displayed in the 2D view.

- 10 Close the panel.

- 11** To improve the view of the vectors, click and drag the **Contrast** slider on the **2D View** toolbar to increase the transparency of the image.



Select **Vector > Vector Doctor** or click the **Vector Doctor** button to find and fix common problems with vectors. For more information about this feature, see the Reference Help.



About reliefs

Reliefs are 3D shapes, which you can use to generate 3D machining toolpaths.

You can use the library of relief clipart provided with your installation of ArtCAM, or you can create reliefs from vectors and bitmaps using functions such as the **Shape Editor**. You can also import reliefs from clipart files and from triangle or surface models.

See also

- About vectors (see page 17)
- About bitmaps (see page 24)
- About toolpaths (see page 35)

To create reliefs using the Shape Editor

You can use the **Shape Editor** to create reliefs from closed vectors.

To create a relief from a closed vector:

- 1 In the Project Tree, select the relief layer on which you want to create the relief.
- 2 Select the closed vector.
- 3 On the **Relief Creation** toolbar, click the **Shape Editor**  button. The **Tool Settings: Shape Editor Tool** panel is displayed and node points are displayed on the selected vector.
- 4 Choose the type of profile for the relief. Select:
 - **Round** to use a curved profile.
 - **Square** to use an angled profile.
 - **Plane** to use a flat profile.

An example of the selected profile is displayed.

- 5 If you selected **Round** or **Square**:
 - a Enter an **Angle** or move the slider to specify the angle of the profile.

Specify a positive angle to create a convex profile; specify a negative angle to create a concave profile.
 - b Choose an option to control the Z height of the relief. Select:
 - No limit** to remove the height restriction. This is the default.
 - Limit to height** to limit the height without retaining the relief's natural shape. If the relief exceeds the specified height, the top of the relief is flattened.
 - Scale to height** to limit the height and retain the relief's natural shape. If the relief exceeds the specified height, the height of the relief is reduced in scale.
 - Constant height** to apply the same height across the entire relief.
 - c If you selected **Limit to height**, **Scale to height**, or **Constant height**, enter the maximum **Height**.
 - d If you selected **Constant height**, enter the **Corner angle**, in degrees, to specify the radius of the corners in the shape.
- 6 Enter a **Start height** to specify the Z height at which ArtCAM creates the relief.

- 7 To apply a scaling factor to the relief's Z axis, select the **Scale** check box, and then enter a scale value in the box.
- 8 Choose a **Relief combine mode** option to specify how you want the relief to combine with the selected relief layer.
- 9 Click **Apply**. ArtCAM applies the changes.
- 10 Click **Cancel** to close the panel.

To import reliefs

You can import reliefs from ArtCAM proprietary files, such as [.rlf](#) and [.art](#), and from image files, such as [.pix](#), [.bmp](#), [.dib](#), [.rle](#), [.jpg](#), [.jpeg](#), [.jfif](#), [.gif](#), [.emf](#), [.wmf](#), [.tif](#), [.tiff](#), [.png](#), [.ico](#), [.wmf](#), and [.emf](#).

To import a file as a relief:

- 1 Select the **3D View** tab to display the 3D view.
- 2 In the Project Tree, select the relief layer on which you want to work.
- 3 Select **Relief > Import > Import**. The **Relief Import** dialog is displayed.
- 4 Select the file you want to import.
- 5 If you selected a [.bmp](#), [.dib](#), [.rle](#), [.jpg](#), [.jpeg](#), [.jfif](#), [.gif](#), [.emf](#), [.wmf](#), [.tif](#), [.tiff](#), [.png](#), or [.ico](#) file, specify the relief's maximum Z height in the **Max. Z** box.
- 6 Click **Open**. The **Open** dialog closes, the relief is shown in the 3D view, and the **Tool Settings: Transform** panel is displayed.
- 7 Use the panel to specify the relief's size, scale, position, orientation, and shape.

To add pieces of relief clipart to the Relief Clipart Library

To accelerate working with reliefs, a collection of ready-to-use pieces of relief clipart are provided with your ArtCAM installation. To use the pieces of relief clipart, you must download and install the pieces to add them to the Relief Clipart Library.

To add the pieces of relief clipart to the Relief Clipart Library:

- 1 Select **Relief > Clipart Library** or click the **Relief Clipart Library**



button. The **Relief Clipart Library** panel is displayed.

- 2 At the bottom of the panel, click **Get More Clipart**. The file to download is displayed in a web browser.
- 3 Follow the instructions in the browser to download the Application (.exe) file.
- 4 When you have downloaded the file, exit ArtCAM.
- 5 Locate the file in Explorer.
- 6 Right-click the file, then select **Run as administrator** in the context menu. The **Autodesk ArtCAM Relief Clipart Library Setup** wizard is displayed.
- 7 Follow the instructions in the wizard to install the reliefs.
- 8 When you have installed the reliefs, start ArtCAM.
- 9 To import a piece of relief clipart from the Relief Clipart Library:
 - a Display the **Relief Clipart Library** panel.
 - b In the **Choose library** area, select a library option in the list. ArtCAM displays thumbnails for the available pieces of relief clipart.
 - c Click a thumbnail. The **Tool Settings: Transform** dialog is displayed and a preview of the piece of relief clipart is shown in blue and surrounded by a bounding box in the 3D view.
 - d Use the panel to specify the piece of relief clipart's size, scale, position, orientation, and shape, and choose how to add the piece to the relief layer.

To transform a piece of relief clipart

When you have imported a piece of relief clipart, you can transform it by changing its scale, position, orientation, and shape before pasting it onto the relief layer.

To transform a piece of relief clipart:

- 1 In the 3D view, click the blue preview of the piece of relief clipart.

- 2 Select **Edit > Transform** or click the **Transform**  button. The **Tool Settings: Transform** panel is displayed.

- 3 To resize the relief:

- a Position the cursor over a red handle .
- b When the cursor changes to , , , or , click and drag . The **Width**, **Height**, and **Z range** values in the panel are updated.



Click the **Maintain Aspect Ratio**  button on the panel to preserve the original shape.

- c When you have finished resizing the relief, release the mouse button.
- 4 To reposition the relief:
 - a Position the cursor over the relief.
 - b When the cursor changes to , click and drag the relief to its new position. The **X**, **Y**, **ΔX**, and **ΔY** values in the panel are updated.
 - c When you have finished repositioning the relief, release the mouse button.
 - 5 To rotate the relief:
 - a Position the cursor over the green handle .
 - b When the cursor changes to , click and drag . The rotation angle in the panel is updated.
 - c When you have finished reorienting the relief, release the mouse button.
 - 6 To shear the relief:
 - a Position the cursor over the pink handle .

About toolpaths

Toolpaths are paths along which a tool follows when manufacturing a product. Different toolpaths are available depending on what you are machining and how. For example, ArtCAM includes specific toolpaths for profile machining, fluting, carving, and drilling.

You can use one of the many 2D machining toolpaths available in ArtCAM to machine 2D shapes from vectors, or you can use one of the 3D machining toolpaths to machine 3D shapes from reliefs. When you have created toolpaths, you can simulate them. When the toolpaths are correct, you can save them and export the data to the machine tool to manufacture the product.

When creating a machining toolpath, you must specify:

- the thickness of the sheet or block of material from which the product is to be manufactured;
- the extent of the toolpath; and
- the tools with which you want to machine the product, including the tools' settings, such as stepover and stepdown distances, feed and plunge rates, spindle speeds, and clearance strategies.

You can access many of the functions you need for working with toolpaths from the **Toolpaths** panel. To display the panel, select the **Toolpaths** item in the Project Tree.

See also

- About vectors (see page 17)
- About reliefs (see page 28)

About 2D machining toolpaths

Use 2D machining toolpaths when you want to machine 2D shapes.

ArtCAM includes several types of 2D toolpath for rough- and finish-machining. Use a rough-machining toolpath, such as area clearance, for removing bulk material; and use a finish-machining toolpath, such as carving or fluting, for smoothing surfaces.



The availability of some toolpaths is license dependent.

The following example demonstrates how to create profiling toolpaths from vectors to machine a plaque.

To machine a plaque from vectors - example

This example describes how to create two profiling toolpaths from vectors to machine the following *Reception* plaque from a 500 x 300 x 20 mm sheet of material:



The toolpaths use two different-sized end-mill tools for cutting away the material. The first toolpath uses the smaller tool and is for carving out small amounts of material to create the plaque's border and *Reception* text; the second toolpath uses the larger tool and is for cutting out the plaque from the sheet of material.

Step 1: To create the model and vectors

This section describes how to create the model and the vectors for the *Reception* plaque.

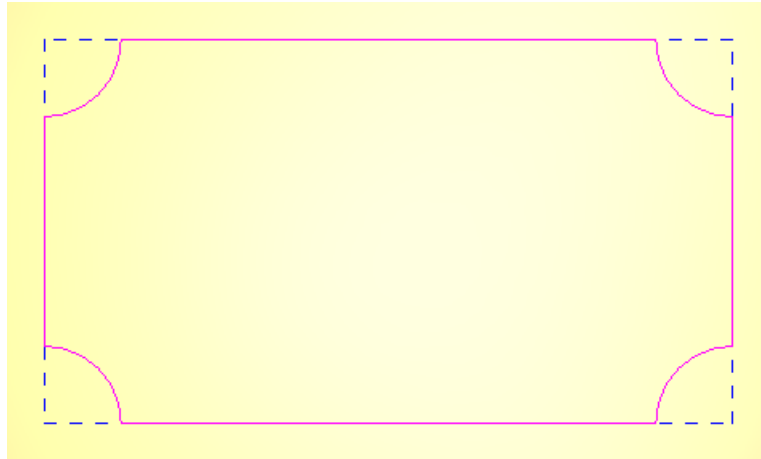
To create the model and the vectors:

- 1 Create the model:
 - a Display the **New Model** dialog.
 - b Select **mm** as the **Units**.
 - c Enter a:
Width (X) of **500**.
Height (Y) of **300**.
 - d Specify a **Resolution** of approximately **1500 x 900** points.
 - e Click **OK**.
- 2 Create the vector to represent the plaque's edge:
 - a Select **Vector > Create > Rectangle**. The **Tool Settings: Rectangle Creation** panel is displayed.
 - b Select **Rectangle**.
 - c Enter a:
Width of **450**.

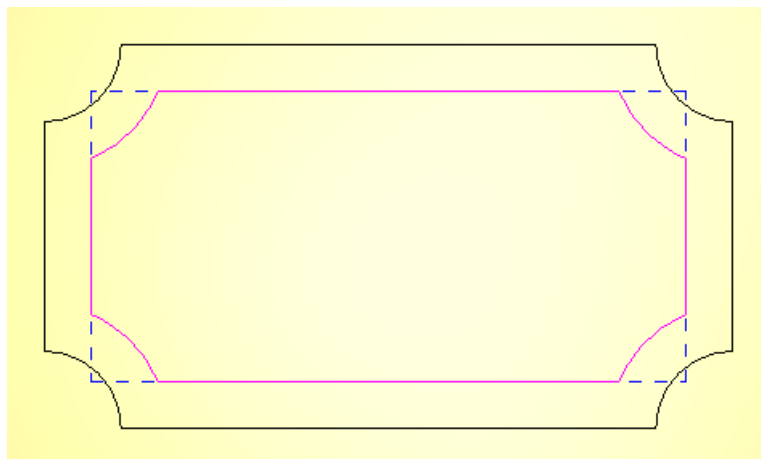
Height of 250.

Corner radius of 50.

- d** Select the **Invert corners** check box.
- e** Click **Create**. ArtCAM creates the vector and displays it in the 3D view:

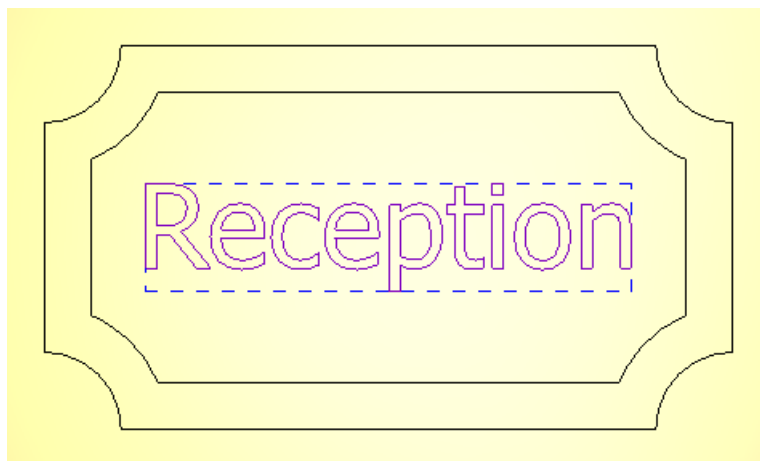


- 3** Create an offset vector from the plaque's edge to create a border:
 - a** Select **Vector > Offset**. The **Tool Settings: Offset Vectors** panel is displayed.
 - b** Enter an **Offset distance** of **30**.
 - c** Select **Inwards/left**.
 - d** Select **Chamfered**.
 - e** Click **Offset**. ArtCAM creates the vector and displays it in the 3D view:



- f** Click the 3D view to deselect the vectors.
- 4** Create the vector text:
 - a** Select **Vector > Create > Text**. The **Tool Settings: Text Tool** panel is displayed.

- b** In the **Font** list, select **Tahoma**.
- c** Select a **Size** of **55 mm**.
- d** Click the 3D view and enter **Reception**.
- e** Click **Create**. ArtCAM creates the vector and displays it in the 3D view.
- f** Select **Vector > Align > Centre in Model** to position the vector text within the centre of the plaque:



- g** Click the 3D view to deselect the vectors.

See also

- To create a model (see page 5)
- To create geometric shapes (see page 19)

Step 2: To carve-out the plaque's border and Reception text

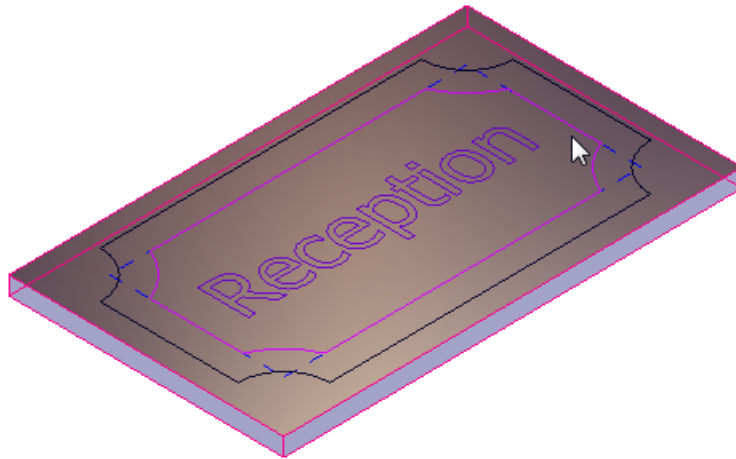
This section describes how to create the first profile toolpath, which applies to the offset vector and to the vector text. Use this toolpath to carve-out small amounts of material for the plaque's border and the *Reception* text using a 5 mm end-mill tool.

To create the first toolpath:

- 1** In the Project Tree, select the **Toolpaths** item. The **Toolpaths** panel is displayed.
- 2** In the **2D Toolpaths** area, click the **Create Profile Toolpath** button. The **2D Profiling** panel is displayed.
- 3** Select the vectors to be machined:
 - a** In the **Profile Type & Vector Association** area, select **Outside** and **Selected vectors** in the **Profile** lists.



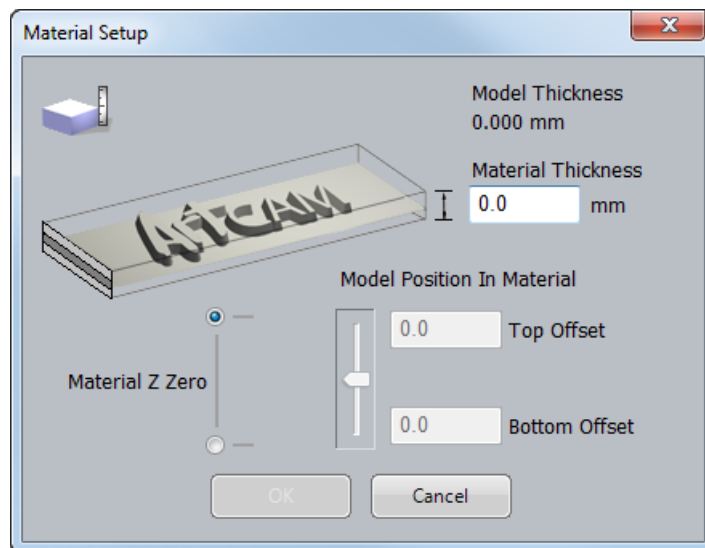
- b** Hold the **Shift** key, then select the vector text and the offset vector. The vectors are displayed in purple:



Click the **Isometric View 1**  button on the **3D View** toolbar to display this view.

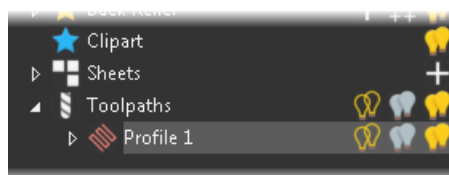
- 4** Specify the tool for profile machining the selected vectors:
 - a** In the **Profiling Tool** area, click the **Click to Select** control bar. The **Tool Database** dialog is displayed.
 - b** In the **Tools & Groups** area, select **Tools & Groups > Metric Tools > Wood or Plastic > Roughing and 2D Finishing > End Mill 5 mm**. The tool's details are displayed in the **Tool / Group Description** area.
 - c** Click **Select**. The dialog closes.
- 5** Specify the settings for the toolpath:
 - a** In the **Profile Type & Vector Association** area, enter an **Allowance** of **0** to specify the distance between the tool and the selected vectors.
 - b** In the **Cutting Depths** area, enter a **Start depth** of **0** to specify the depth from the material's surface at which the tool begins machining.
 - c** Enter a **Finish depth** of **10** to specify the depth from the material's surface at which the tool stops machining.
 - d** Enter a **Tolerance** of **0.01** to specify how closely the tool follows the selected vectors.
 - e** In the **Profiling Tool** area, select **Climb** in the **Cutting direction** list to specify climb milling instead of conventional milling. Climb milling means the tool's cutter rotates in the same direction as the feed motion. This often provides a better finish and prolongs the life of the tool.

- f** In the **Options** area, click the **Safe Z** and **Home** control bar to display its settings.
 - g** Enter a **Safe Z** value of **10** to specify the height above the material's surface at which the tool can make rapid moves between toolpath segments.
 - h** Enter a **Home X** value of **0**, a **Home Y** value of **0**, and a **Home Z** value of **10** to specify the tool's start and end position.
- 6** Specify the dimensions of the sheet of material from which the plaque is to be machined:
- a** In the **Options** area, click the **Click to Define Material** control bar. The **Material Setup** dialog is displayed.

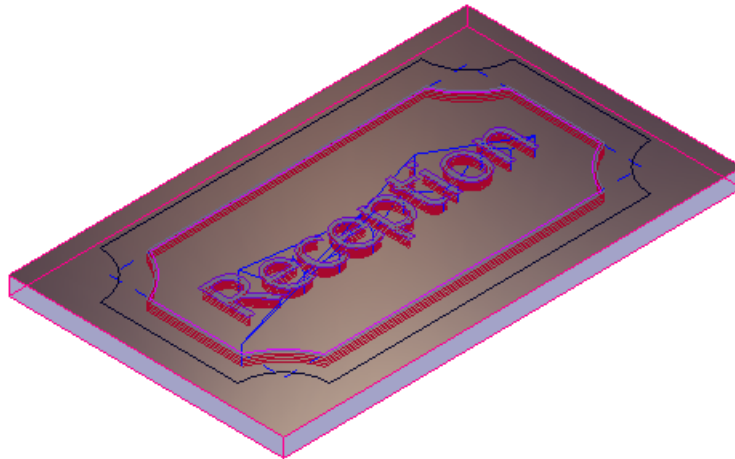


- b** Enter a **Material Thickness** of **20**.
 - c** Click **OK**. The dialog closes and a transparent sheet of material is displayed in the 3D view.
- 7** Enter a **Name** of **Profile 1** for the toolpath.
- 8** Click **Calculate Now**.

ArtCAM calculates the toolpath and adds a **Profile 1** item under the **Toolpaths** item in the Project Tree:



The toolpath (red) and rapid moves (blue) are displayed:



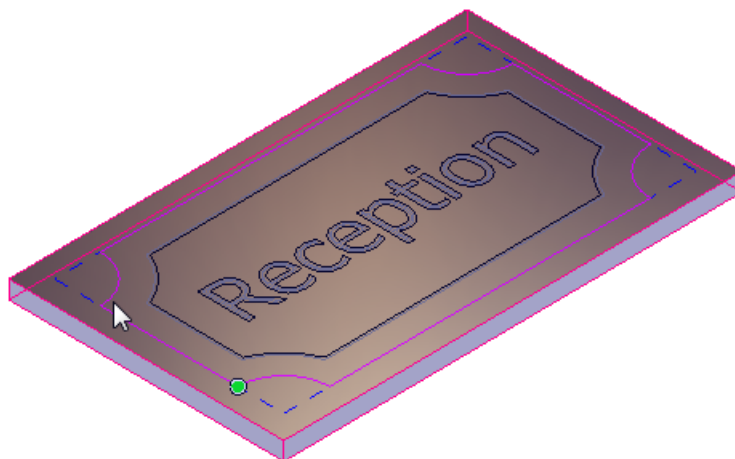
- 9 In the Project Tree, click the lightbulb  icon next to the **Profile 1** item to hide the toolpath. The icon changes to .
- 10 Click the 3D view to deselect the selected vectors.

Step 3: To cut-out the plaque

This section describes how to create the second profile toolpath, which applies to the vector representing the plaque's edge. Use this toolpath to cut out the plaque from the sheet of material using a 10 mm end-mill tool.

To create the second toolpath:

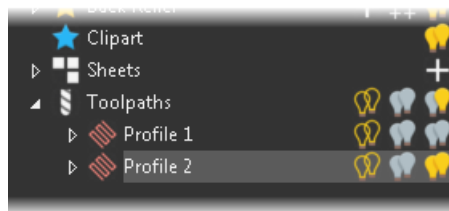
- 1 In the **Profile Type & Vector Association** area of the **Profiling** panel, select **Outside** and **Selected vectors** in the **Profile** lists.
- 2 Select the vector representing the plaque's edge. The vector is displayed in purple:



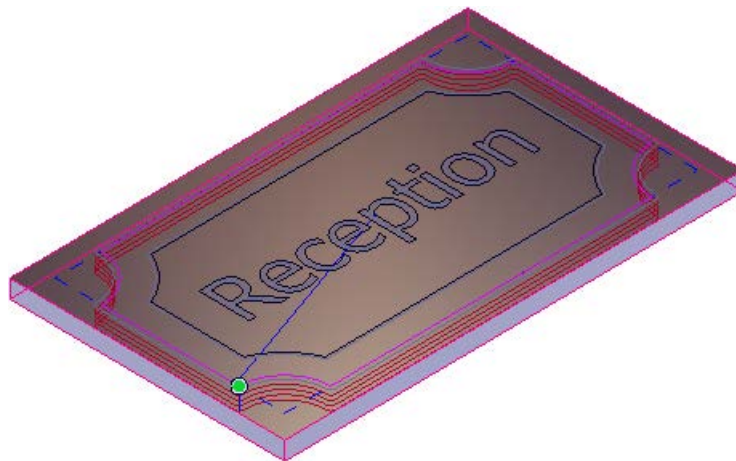
- 3 Change the 5 mm end-mill tool to a 10 mm end-mill tool:

- a In the **Profiling Tool** area, click  to expand the **End Mill 5 mm** area.
 - b Click **Select**. The **Tool Database** dialog is displayed.
 - c In the **Tools & Groups** area, select **Tools & Groups > Metric Tools > Wood or Plastic > Roughing and 2D Finishing > End Mill 10 mm**. The tool's details are displayed in the **Tool / Group Description** area.
 - d Click **Select**. The dialog closes.
- 4 In the **Cutting Depths** area, change the **Finish depth** to **20** to specify that the tool machines through the entire depth of material.
 - 5 Enter a **Name** of **Profile 2** for the toolpath.
 - 6 Click **Calculate Now**.

ArtCAM calculates the toolpath and adds a **Profile 2** item under the **Toolpaths** item in the Project Tree:



The toolpath (red) and rapid moves (blue) are displayed:



- 7 Close the panel.

You can now simulate the toolpaths before saving them to a machine-specific file.

See also

- To simulate toolpaths (see page 51)
- To save toolpaths (see page 53)

About 3D machining toolpaths

Use 3D machining toolpaths when you want to machine 3D shapes.

ArtCAM includes several types of 3D toolpath. For example, machine-relief toolpaths for machining entire reliefs; feature-machining toolpaths for machining raised and recessed features; and laser-machining toolpaths for removing waste material using a laser-engraving machine.



The availability of some toolpaths is license dependent.

The following example demonstrates how to create machine-relief toolpaths from one of the reliefs available in the Relief Clipart Library.

To machine a relief - example

This example describes how to create two machine-relief toolpaths from a relief to machine the following lizard design from a 500 x 300 x 45 mm block of material:



The toolpaths use two different-sized, ball-nosed tools for cutting away the material. The first toolpath uses the larger tool and is for removing the bulk of the material; the second toolpath uses the smaller tool and is for surface finishing the relief.

The lizard design is one of a collection of ready-to-use pieces of relief clipart provided with your ArtCAM installation. To use the lizard design, you must first download and install the collection of pieces of relief clipart to add them to the Relief Clipart Library.

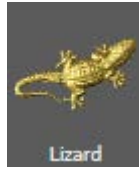
Step 1: To create the model and import the piece of relief clipart

This section describes how to create the model and import the lizard design from the Relief Clipart Library.

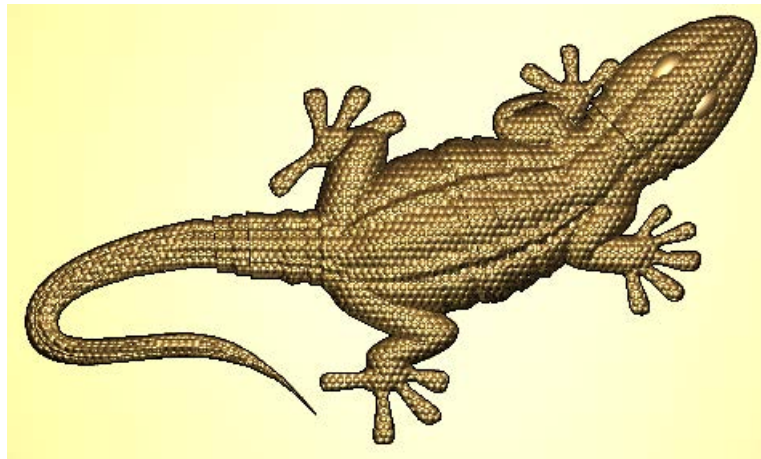
To create the model and import the piece of relief clipart:

- 1** Create the model:
 - a** Display the **New Model** dialog.
 - b** Select **mm** as the **Units**.
 - c** Enter a:
Width (X) of **500**.
Height (Y) of **300**.
 - d** Specify a **Resolution** of approximately **1500 x 900** points.
 - e** Click **OK**.
- 2** Import the lizard relief from the Relief Clipart Library:

- a Display the **Relief Clipart Library** panel.
- b In the **Choose Library** area, select **Animals**.



- c Click the **Lizard** thumbnail. The **Tool Settings: Transform** panel is displayed and the piece of relief clipart is shown in the 3D view.
- d At the bottom of the panel, click **More options**. The panel displays options for pasting the relief clipart.
- e Select the **Add** option.
- f Select the **Paste outline vector** check box.
- g Click **Paste**. ArtCAM adds the piece of relief clipart and displays the relief in the 3D view:



See also

- To create a model (see page 5)
- To add reliefs to the Relief Clipart Library (see page 32)

Step 2: To remove the bulk material

This section describes how to create the first machine-relief toolpath, which applies to the entire block of material. Use this toolpath to remove the bulk of the material using a 3 mm ball-nosed tool.

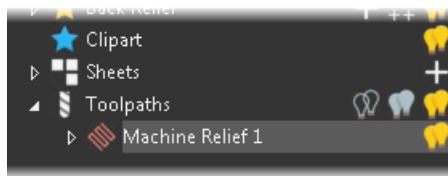
To create the first toolpath:

- 1 In the Project Tree, select the **Toolpaths** item. The **Toolpaths** panel is displayed.

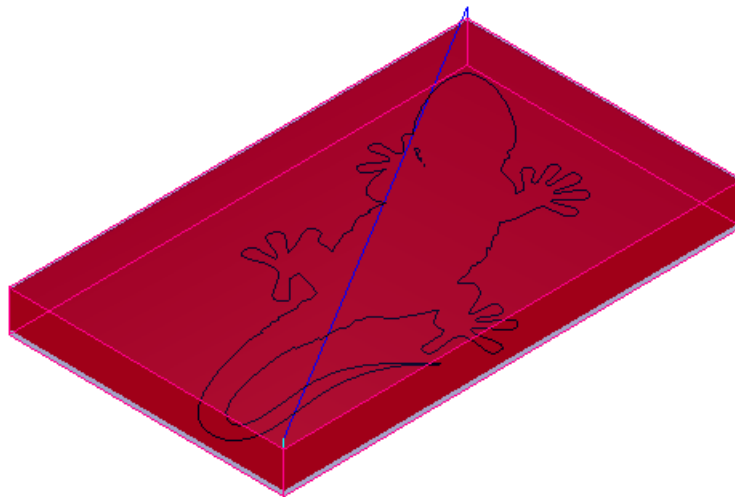
- 2 Click the **Create Machine Relief Toolpath**  button. The **Machine Relief** panel is displayed.
- 3 In the **Area to Machine** area, select **Whole relief** in the list.
- 4 Specify the tool for machining the relief:
 - a In the **Finishing Options** area, click the **Click to Select** control bar. The **Tool Database** dialog is displayed.
 - b In the **Tools & Groups** pane, select **Tools & Groups > Metric Tools > Wood or Plastic > 3D Finishing > Ball Nose 3 mm**. The tool's details are displayed in the **Tool / Group Description** pane.
 - c Click **Select**. The dialog closes and the tool's settings are displayed in the panel.
- 5 Specify the settings for the toolpath:
 - a In the **Tool clearance strategy** list, select **Raster (Classic)** to machine in multiple passes, back and forth along the X axis.
 - b Enter an **Angle** of **0** to specify the angle between the tool and the X axis.
 - c Enter a **Tolerance** of **0.01** to specify how closely the tool follows the relief.
 - d Enter an **Allowance** of **0.1** to specify the distance between the tool and the relief.
 - e Click the **Multiple Z passes** control bar to display its settings.
 - f Select the **Do multiple Z passes** check box to enable the tool to remove the material in a series of passes. For each pass, the tool moves downwards by the **Stepdown** value, which is 3 mm.
 - g Enter a **Start Z** value of **-3** to specify the depth from the material's surface at which the tool machines the first pass.
 - h Enter a **Finish Z** value of **-45** to specify the depth from the material's surface at which the tool machines the last pass.
 - i In the **Options** area, click the **Safe Z** and **Home** control bar to display its settings.
 - j Enter a **Safe Z** value of **10** to specify the height above the material's surface at which the tool can make rapid moves between toolpath segments.
 - k Enter a **Home X** value of **0**, **Home Y** value of **0**, and **Home Z** value of **10** to specify the tool's start and end position.
- 6 Specify the dimensions of the block of material from which the relief is to be machined:

- a In the **Options** area, click the **Click to Define Material** control bar. The **Material Setup** dialog is displayed.
 - b Enter a **Material Thickness** of **45**.
 - c Click **OK**. The dialog closes and a transparent block is shown around the lizard relief in the 3D view.
- 7 Enter a **Name** of **Machine Relief 1** for the toolpath.
- 8 Click **Calculate Now**.

ArtCAM calculates the toolpath and adds a **Machine Relief 1** item under the **Toolpaths** item in the Project Tree:



The toolpath (red), rapid moves (blue) and plunge moves (cyan) are displayed:



- 9 In the Project Tree, click the lightbulb icon next to the **Machine Relief 1** toolpath to hide the toolpath. The icon changes to

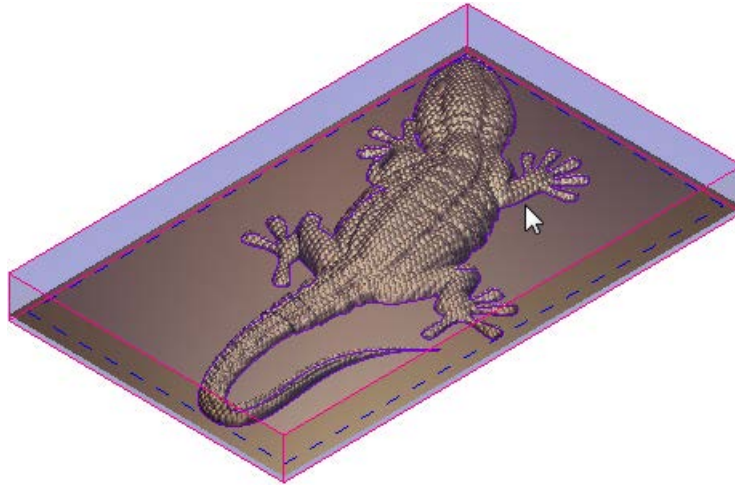
Step 3: To smooth the relief

This section describes how to create the second machine-relief toolpath, which applies only to the relief itself, as defined by the vector boundary. Use this toolpath to surface finish the relief using a 1.5 mm ball-nosed tool.

To create second toolpath:

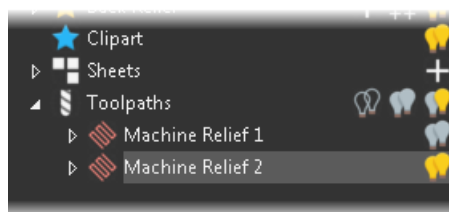
- 1 In the **Area to Machine** area of the **Machine Relief** panel, select **Selected vector** in the list.
- 2 Select **Inside vectors** to apply the toolpath to the area within the selected vector.

- 3 Select the vector boundary of the lizard relief. The selected vector is displayed in purple and surrounded by a bounding box:

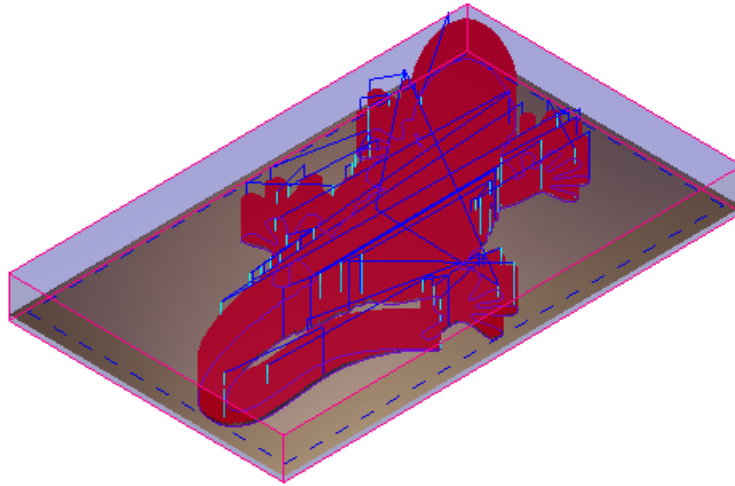


- 4 Change the 3 mm ball-nosed tool to a 1.5 mm ball-nosed tool:
 - a In the **Finishing Options** area, the **Ball Nose 3 mm** control bar to expand the settings.
 - b Click **Select**. The **Tool Database** dialog is displayed.
 - c In the **Tools & Groups** area, select **Tools & Groups > Metric Tools > Wood or Plastic > 3D Finishing > Ball Nose 1.5 mm**. The tool's details are displayed in the **Tool / Group Description** area.
 - d Click **Select**. The dialog closes and the tool's settings are displayed in the panel.
- 5 Change the **Start Z** value to **-1.5**.
- 6 Enter a **Name** of **Machine Relief 2** for the toolpath.
- 7 Click **Calculate Now**.

ArtCAM calculates the toolpath and adds a **Machine Relief 2** item under the **Toolpaths** item in the Project Tree:



The toolpath (red), rapid moves (blue), and plunge moves (cyan) are displayed:



8 Close the panel.

You can now simulate the toolpaths before saving them to a machine-specific file.

See also

- To simulate toolpaths (see page 51)
- To save toolpaths (see page 53)

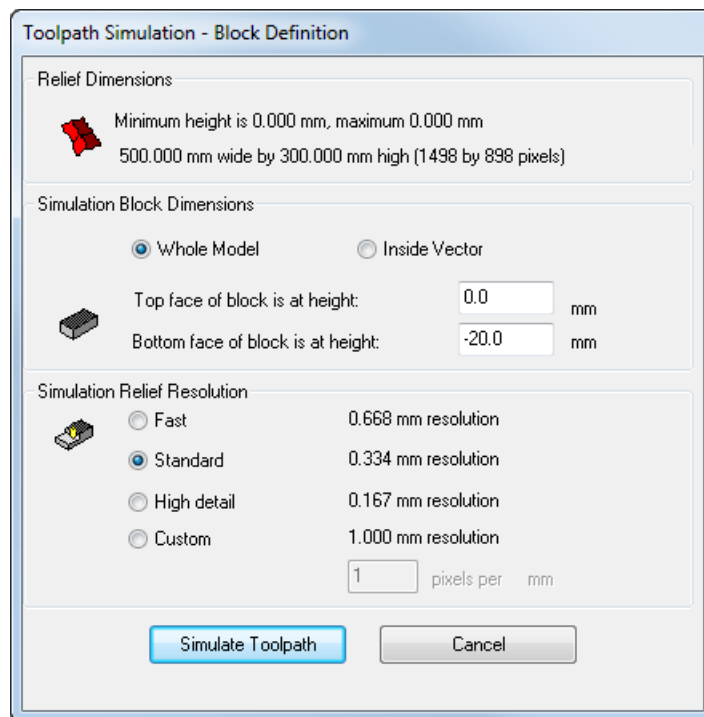
To simulate toolpaths

When you have created the toolpaths to machine the product, you can simulate the toolpaths to visualise the machining passes and the resulting surface finish.

To simulate all toolpaths within a model:

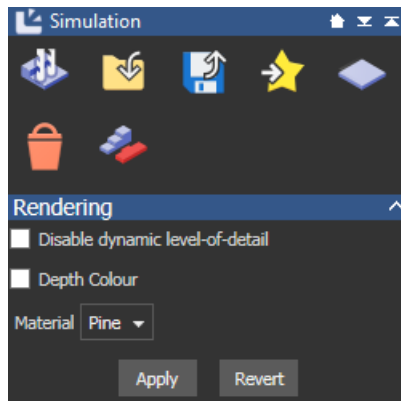
- 1 In the Project Tree, select the **Toolpaths** item. The **Toolpaths** panel is displayed.

- 2 In the **Simulation** area, click the **Simulate All Toolpaths** button. The **Toolpath Simulation - Block Definition** dialog is displayed, for example:



- 3 Choose how much of the toolpath you want to simulate. Select:
 - **Whole model** to simulate the entire model; or
 - **Inside vector** to simulate part of the model within the selected vector.
- 4 Choose the resolution for the simulation. Select:
 - **Fast** to use a low resolution, which reduces the quality of the simulation but increases the speed.
 - **Standard** to use a resolution that compromises between the quality of the simulation and the speed.

- **High detail** to use a high resolution, which increases the quality of the simulation but reduces the speed.
 - **Custom** to specify a resolution.
- 5 Click **Simulate Toolpath**. ArtCAM simulates the machining passes and adds a **Simulation** item to the Project Tree.
 - 6 In the Project Tree, select the **Simulation** item. The **Simulation** panel is displayed.



- 7 To visualize the machined relief in the material from which it is to be manufactured, select a **Material** in the list, then click **Apply**.
- 8 If you are cutting the relief out from a block of material, click the



Delete Waste Material button and then click the waste material in the 3D view that you want to remove.

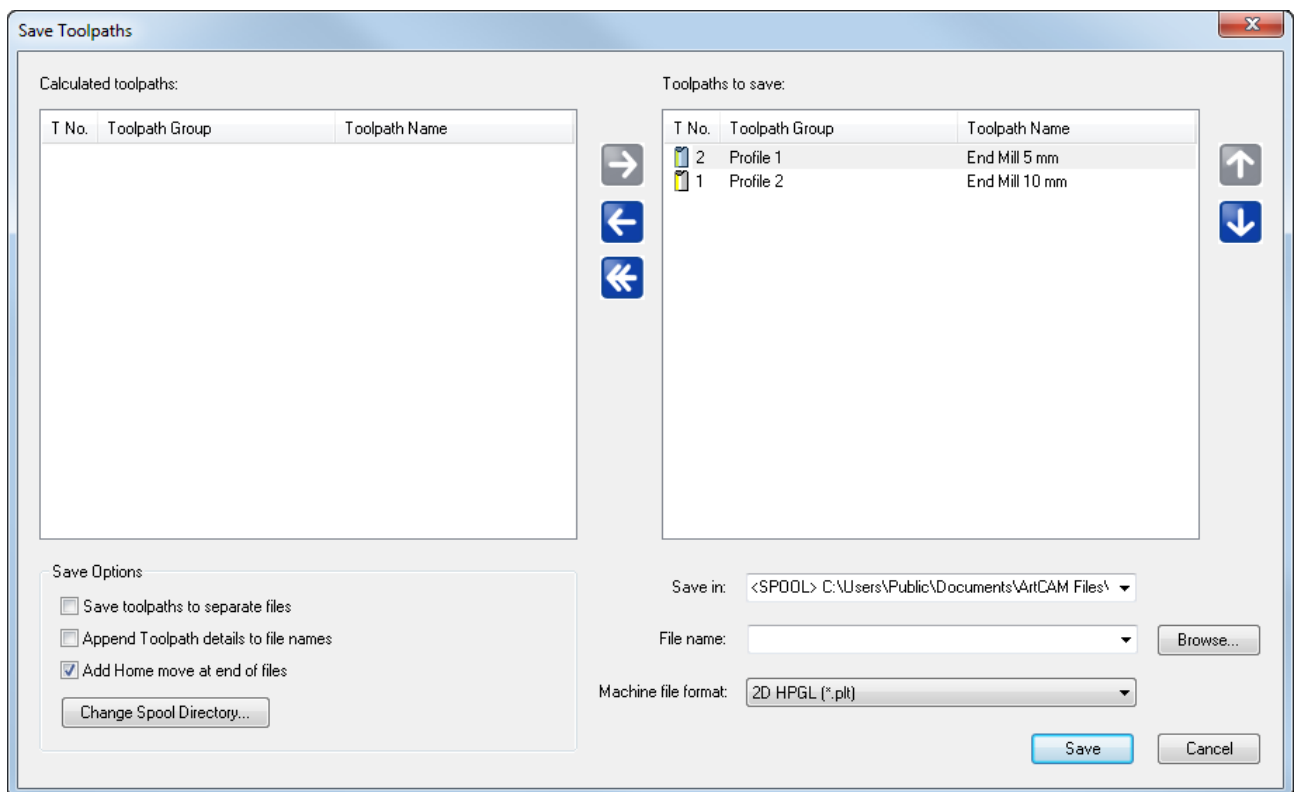
To save toolpaths

After you have created and simulated the toolpaths, you must save the toolpaths as machine-specific files so you can export the data to the CNC machine tool.

To save all toolpaths within a model:

- 1 In the Project Tree, select the **Toolpaths** item. The **Toolpaths** panel is displayed.

- 2 In **Toolpath Operations** area, click the **Save Toolpaths** button. The **Save Toolpaths** dialog is displayed, for example:



- 3 Use  and  to order the toolpaths.
- 4 Specify the folder in which you want to save the file:
 - a Click **Browse**. The **Browse** dialog is displayed.
 - b Select the folder.
 - c Click **Open**. The dialog closes and the path is displayed in the **Save in** box.
- 5 Enter a **File name**.
- 6 In the **Machine file format** list, select file type for the machine tool.

- 7 Click **Save**.
- 8 Close the dialog.

To save a model

When you have finished working on a model, you need to save it as an ArtCAM Model (.art) file.

To save a model:

- 1 Select **File > Save As**. The **Save Model As** dialog is displayed.
- 2 Select the folder in which you want to save the model.
- 3 Enter a **File name**.
- 4 Click **Save** to save the file.



To save a previously saved version of the model to its existing

*folder and filename, select **File > Save** or click the **Save***



*button on the **File** toolbar.*

To exit ArtCAM

To exit ArtCAM, select **File > Exit**.

If you have any unsaved changes, you are prompted to save them before closing. Click:

- **Yes** to save the changes and then exit.
- **No** to exit without saving the changes.
- **Cancel** to continue working.

See also

- To save a model (see page 55)

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